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III. *A Second Letter of Dr Wallis to the Publisher, relating to Mr Somner's Treatise of Chartham News : And, some Magnetick Affairs.*

Oxford, Decemb. 30. 1701.

S I R,

SINCE my Letter of *Septemb. 20. 1701*, (which, with the Post-script, you have thought fit to publish in your Transactions, for *October 1701.*) relating to the Discourse called *Chartham-News*, in your Transactions for *July 1701*, (mis-numbred 271, instead of 272,) written by the inquisitive and learned Antiquary Mr *William Somner*, (to whom, I since find, we are beholden for divers other Pieces, beside those I mentioned in that Letter :) I have seen a Letter of Mr *John Luffkin* (in your Transactions for *Sept. 1701.*) which informs us, of divers *Bones* (of an Extraordinary bigness) found lately (in a Gravel-pit) not far from *Harwich* in *Essex*, (much like to those found at *Chart-ham* in *Kent*,) at a great Depth under Ground, which Bone, he thinks, rather to have been the Bone of an *Elephant*, than of an *Hippopotamus*, or other *Marine* Animal.

But, whether the one, or the other, it matters not much as to the present purpose. For, either way, it will equally prove, those Valleys to have been much Deeper, in former times, than now.

If you could obtain from Mr Alderman *Gray* of *Canterbury*, a sight of those Pictures (which he hath) of the Bones mentioned by Mr *Somner* (which, I presume, he would not deny :) or, cause new Draughts of them to be

be made, from the Originals, which are said to be now in the Repository of *Gresham* College : It would not be amiss to give us a Copy of them, in your Transactions. Which would help to determine that Point in Question.

I observe, that the River in *Essex*, and that in *Kent*, (near which the Bones were found,) are (both of them) named the *Stowr*. Which, whether it be a corruption of the Latin *Æstuarium* (as Mr *Somner* conjectures ;) or, of the British *ys-dwr* (that is, *the Waier*,) I will not dispute.

And, That the Bones were found (in both places) much at the *same Depth*, (about 16 or 17 foot, under the surface of the Earth ;) which therefore may (probably) have been lodged (in both places) much about the same Time : And, perhaps, when the Emperor *Claudius* brought his *Elephants* into *Kent* and *Essex* ; As Mr *Luffkin* intimates out of *Dio Cassius*.

I observe also, that those Petrified Bones, in both places, were found in *Gravelly grounds*, (as are those Petrified Shells, and Bodies of Fishes, in Gravel Pits and Stone Quarries, near *Oxford*.) How far the Steams, Fumes, or Fluors of the Earth, which contribute to the formation of Stone or Gravel, may conduce to the Petrifying of these Bones, Shells, or other Bodies ; I leave to the consideration of inquisitive Naturalists.

And, Whether the Impregnation of such *Steams*, may not *Swell* such Petrified Bodies, to a larger Proportion than before they had. Like as we observe Wood (and other like Materials) in a Moist Air, to Swell ; by the Distention of their Pores, upon the intromission of Moist Particles. For I take all Petrifications to be made, either by *Incrustation*, or *Intromission* of Stony Particles.

And I well remember, that (many years ago) at *Moldash* in *Kent*, (not far from *Feversham*) on some High Grounds, and very Stony, (which used to be, sometimes Pasture, and sometimes Plowed,) I have observed di-

vers *Oyster shells* (Petrified, or partly so,) much Larger and Thicker, than the ordinary Proportion of Oysters in those Parts, and very Weighty, which Oyster-shells might have been purposely thrown there long before, as being reputed a good Manure for Land ; and might have been there Impregnated with like *Halitus*, *Effluvia*, as are the Numerous Stones on those Lands.

I have known the Inhabitants, heretofore, have used to cause the Stones, in those Lands (because they are very numerous) to be gathered up, and carried off the Lands, by Cart-loads, to make more room for the Grass to grow. But, of later years, they forbear (I have been told) so to do, as thinking the Warmth (or somewhat equivalent) of those Stones, is rather an Help than Hinderance, of the Earth's Fertility. Of which, I shall not adventure to deliver an Opinion ; but refer it to further consideration.

But (to return to what I was speaking of) I see not why we may not think, the *Stowr* in *Effax*, and the *Stowr* in *Kent*, to have been (both of them) *Æstuaries* of the *Northern Tyde* ; before the Rupture of that *Isthmus* between *Dover* and *Calais* : (And the like of the River near *Malden*, and other small Creeks on the Coast.) Though not so Great as those of *Humber* and the *Thames* : (which were then *Æstuaries* of the same Sea :) as are many others on the Coast of *Scotland*.

I say, *Before that Rupture*. For, since that Rupture, the case (as to the *Thames*) is somewhat altered. For the Western Tyde (between Us and *France*) which was then stopped at this *Isthmus* ; doth now flow-on (through that *Fretum*) beyond the Mouth of the *Thames*, (as high as the *Dogger-sands* ;) which doth therefore supply the *Æstuarie* of the *Thames*, which was formerly furnished from the Northern Sea.

And, these smaller *Æstuaries* might sooner be swarved-up (by what every Tyde lodgeth there,) while, those
Greater

Greater Estuaries, are but Shortened, and become Narrower, than they had formerly been.

And, as to the *Thames* in particular; It seems very Evident, (if we consider their Situation, and the Nature of their Soil,) that much of the Low Grounds (in *Kent* and *Essex*,) on both sides of the Mouth of the *Thames* (adjacent to the Sea,) had formerly been Sea, (as well as that of *Romney Marsh*.) And when the Mouth of the *Thames* was so much wider, no doubt but it Flowed much further than now it doth. And, how far, who can tell?

It may perhaps be objected, that the small Rivers now remaining, in the bottom of these Vallies, which may have been supposed (in former times) to have been *Æstuaries*; do now run more Wriggling (with more Turnings and Windings) than do these Vallies. But this need not at all to seem strange, when as we may daily see the same, in the Bottom of a Muddy Ditch (or Water-course) when the Water is almost Drained-off, the Mud yet remaining soft: the little Water, yet remaining, will work out of it self (amidst the Mud) a Wriggling passage (according as the Mud will more or less give way) much more Crooked than was such Ditch when full of Water. And the like must needs happen in the (gradual) Draining of such *Æstuaries*, according as the (soft) Earth will permit. Which Crookedness will continue, when the Banks on both sides do (by degrees) grow firmer.

These Notions I give ye, as my present Thoughts; upon supposition that there have been such an *Isthmus* and so broken. If in ought I have mistaken; I am willing to be set right, by those who are better acquainted with these Seas, than I am: with whom (at this distance) I have not the opportunity of discoursing, for better information.

As to what I say, concerning the Isle of *Oxney* ; I did then purposely omit many Circumstances, which I did not think much material to the point in hand : Choosing so to do, rather than to be in danger of misrepresenting (on my present Memory) what I had heard long before, That which I thought material to the point in hand, was this, That a low Level, in the Isle of *Oxney*, (which had for divers years lain under Water,) is now Raised by intromitting the Tyde) to a considerable height above what it had formerly been ; And, that the Channel from thence to *Rye*, is (by the Tydes passing in and out become much Wider and Deeper than heretofore. Both) which are Evident, and not to be denied.

If you would have me speak more particularly to this matter (so far as my Memory serves me) I take it to be thus.

If we look in the more Antient Maps of *Kent* (older than the year 1640) you will find, that (what we call) the *Isle of Oxney*, was then but a *Pen-insula* ; being (by a small *Isthmus* or neck of Land at the North-East corner of it) continued to the rest of the Country : And the Tyde from *Rye* to that place (which now flows straight onward on the North side of the Isle) was there stopped by that *Isthmus*, and did wheel about on the South side of it : Or rather, the River *Rother*, did (from the North side of the Island) wheel about by the South side (to that Eastern corner,) and thence (by the Chanel) to *Rye*.

While things were in this state ; divers Moorish or Marsh-lands, adjoining to the River *Rother*, were oft in danger (upon great Rains) to be Drowned. But so it once happened (by what accident I know not,) that, this Drowned Land, had unexpectedly (in a nights time, or little more) discharged itself on another Level, somewhat lower than itself.

Upon which Indication ; it was thought Advisable (by cutting that *Isthmus*) to allow those Waters (on the North side of the Island) a straighter passage toward *Rye* ; and, to let those Lower Grounds (for some time) to lye under Water (paying the Rent of them,) till such time as (by intromitting the Tyde) they might be somewhat hightened ; and, then, timely recovered.

In order to which ; *Commissions of Sewers* have ever since (from time to time) been issued out for that purpose ; and the work (in good measure) effected, though not quite finished.

This I take to be the true state (in brief) of that affair : But, under correction, if (in some circumstances) my Information, or my Memory, may have failed me.

But I think it might be Acceptable, if some Gentleman (who is an Inhabitant of those parts, and hath been acquainted with the Proceedings of the *Commissioners of Sewers* there (for Fifty or Threescore years last) would give us a more particular History of those Proceedings. Which might be of good use for the Direction of others (in like Circumstances) for obtaining like Advantages as these have done ; and, avoiding Inconveniences which may have happened.

And the like, if Mr *de la Pryme* (whom you mention, to good purpose, in your Transactions for *October 1701*) could give us an Account of the Methods used by Sir *Cornelius Vermuiden* in his Draining of *Hatfield-Chace*.

I was about to end here. But (while discoursing of Maritime Affairs) a Friend of mine would have me suggest to you, a Conceit of mine concerning the *Mariners Compass*, (which being of prodigious Use in Navigation, it is not agreed, Where, or by Whom, it was first Invented.) I have Guesſed it to have been an *English* Invention. Not only for that the *English* have been long conversant in Navigation : But, even from the Name *Compass*. Which is used in *England* (I am sure it was wont

to be so used in *Kent*, when I was a *Youth*,) for what we otherwise call a *Circle*. And I take it to be an old *English* word in that sense; though now (in imitation of the *French*) the word *Circle* be more common. I know not whether a *Compass* (or any word like it) be so used, for a *Circle*, in any other Language; (but rather *Cercle* in French; *Cerchio* in Italian; *Circulo* in Spanish; or some other word derived from the Latin *Circulus*.) And from hence, the *Circulus Nauticus* may come to be called the *Mariners Compass*, which name, being given it by the first Inventers, might give occasion for like Names in other Languages; (*compas, compasso, zee-kompas, &c.*) I do not deny but that the *Circinus*, or Instrument by which we describe a *Circle* (called by us a *pair of Compasses*) may have some like name in other languages. But, how anciently, I do not know; nor that a *Circle* absolutely consider'd (other than this *Circulus nauticus*) is so called. Howfar this conjecture, from the Name, may give us a Title to the Invention, (till a better do appear;) I shall not determine; but only suggest to Consideration.

I think it is now agreed on all hands, That (what we call) the *Variation of the Variation*, is an *English Discovery*, (of Mr Gellibrand, if I mistake not, one of Sir Thomas Gresham's Professors at Gresham Colledge;) about the the year 1635. That is, That the *Magnetick Needle* (in its Horizontal Position) doth not retain the same *Declination* or *Variation* from the true North, (in the same place, at all times, but doth (successively) vary (that Declination) from time to time. Which though it were, about that time, a *New Discovery*; is Now admitted as an Undoubted Truth.

And (what we call) the *Dipping Needle*; is admitted also to be an *English Discovery*, somewhat Elder than that former. (I cannot say at present, whether by Mr Blagrove, or some other Greshamite.) That is, That the *Magnetick Needle*, (besides its Direction toward the North

North, in its Horizontal Position,) hath also a Direction of Altitude above the Horizon. And (if duly poised about an Horizontal Axis) will point to a determinate degree of Altitude or Elevation above the Horizon, in this or that place respectively. Of which Discovery (though made so long ago,) I do not find that much Use hath hitherto been made: that, of its Horizontal Declination, being more serviceable.

'Tis also an *English Observation*, That not only a *Magnetick Needle*, but any Piece of *Iron* (if kept long in the same Posture,) shall of it self contract a *Polarity*. As, for instance, an Erect Bar in a Window, (after long continuance in that Position, will (if duly poised) be found, with its upper end, to point toward the North; (and Southward with the other end.) And, if afterwards it be continued long in a contrary Position, it will attain a contrary Polarity.

And Mr *Gilbert's* Notion, (of the Earths whole Body, being but one Great Magnet; and, lesser Magnets being so many *Terrella's*, sympathizing with the whole,) is *English* also.

It hath been observed also, That a Magnetick Needle, if heated Red-hot, will lose its Polarity: And, if then cooled in a contrary Position, will acquire a contrary Polarity.

It hath also been observed (if I have not been misinformed) by our *English* Mariners, (and, I think, more than once,) that, upon a great Flash of *Lightening* (at Sea) their Magnetick Needle hath lost its former Polarity; and contracted the contrary; (pointing the wrong way, and directing the Mariner to a wrong Course.)

And (in General) the Doctrine of *Magnetism* hath been more improved by our *English* Naturalists, than (for ought I know) by any other Nation. And, if some of our *Gres-hamites* would take the pains to give us a true History of these (and the like) improvements: it would

be an acceptable service,* for the Honour of the *Nation*, and of that *Colledge* in particular, and of the *Royal Society*.

But I must beg your Pardon for this long Digression : And subscribe my self, an Humble Servant of the Royal Society ; And

Yours to serve you,

John Wallis.

IV. *Account of a Book, viz.*

Aloyfi Ferdinandi Comit. Marfigli Danubialis operis Prodromus.

Ad Regiam Societatem Anglicanam. Fol. 1700.

THe Author of this *Prodromus* hath given several proofs of his great Abilities in this part of Learning, as in his *Osservazioni intorno al Bosforo Tracio*, Printed at Rome in 4to. 1681. In his *Dissertatione Epistolare del Fosforo minerale, o Sia della Pietra illuminabile Bolognese*, at Leipsick in 4to cum fig. 1698.

The Piece now before us is only a Plan or Model of a great Work, which *Signor Marfigli* is carrying on in six large Volumes in Fol. Imperial Paper, which he designs to dedicate to the present *Emperor of Germany*, by whose Favour he was employed many years in the Turkish Wars, and continues to receive a noble Salary from the same hand.

The first Tome is to contain the Geographical Part, illustrated with many Charts and actual Surveys of the Banks of the *Danube*, from its rise to its exit into the *Euxine* Sea, describing all along the Channels, Whirlpools,